Space Optical Communications Using Laser Beam Amplification

Completed Technology Project (2013 - 2016)

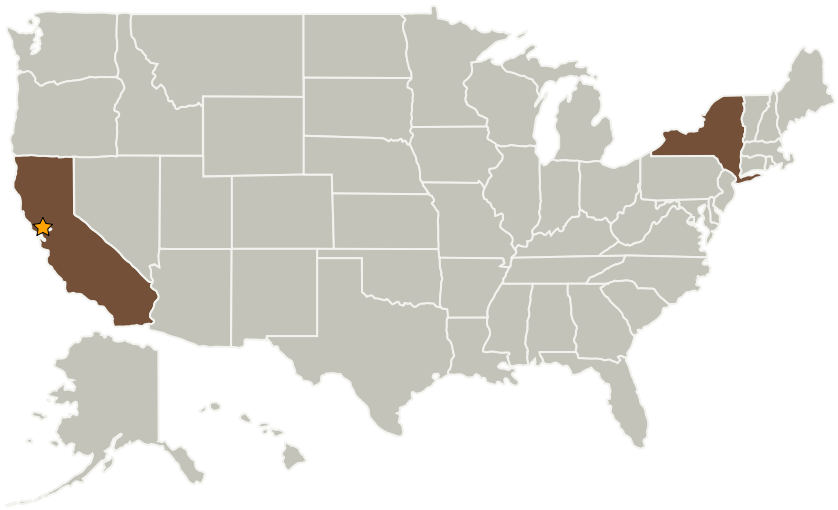
Project Introduction

This project addresses the manner in which data is transmitted from a space terminal using optical communications. In the first year, the objective of the research will be to develop a capability for amplifying a laser beam for use in a modulating retro-reflector (MRR) that is in a satellite in low Earth orbit. This innovation would allow for the use of a weaker laser at the ground terminal. In the second year, the research will be to increase the amplification for studying the feasibility of MMRs inside deep-space spacecraft to simplify and improve the pointing procedure between the Earth and spacecraft terminals.

Anticipated Benefits

This technology will enable amplification of laser beams in modulating retro-reflectors (MRRs) for applications to satellites in low Earth orbit and to deep-space spacecraft.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
University of Rochester	Supporting Organization	Academia	Rochester, New York

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Spacecraft Technology

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Primary U.S. Work Locations	
California	New York

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

Program Director:

Christopher E Baker

Program Manager:

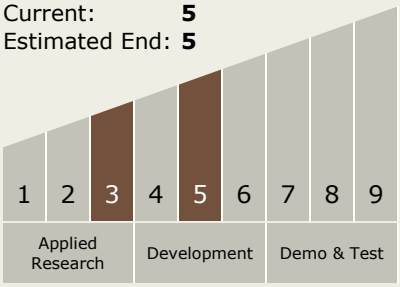
Roger Hunter

Principal Investigator:

Govind P Agrawal

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.3 Lasers

Target Destinations

The Moon, Outside the Solar System